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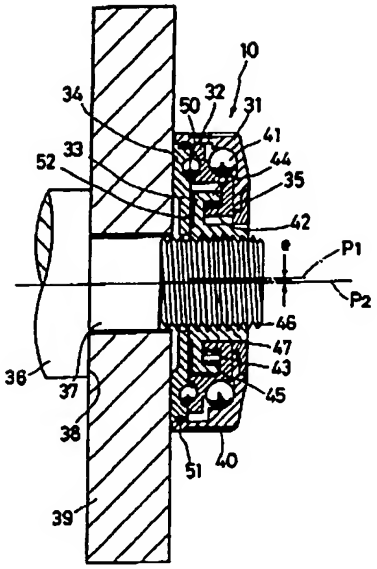
(54) **VIS DE SERRAGE**
(54) **TIGHTENING SCREW**



(57) L'invention concerne une vis de serrage constituée d'une partie vis comprenant un filetage femelle ou un filetage mâle dans l'âme de la tige, un anneau à bride sur le périmètre extérieur de la partie vis venant en contact avec l'élément à serrer, un anneau de manoeuvre qui impartit une force de rotation en venant s'appliquer à l'opposé de l'anneau à bride sur le périmètre extérieur de la partie vis, et un transmetteur de couple placé entre la partie vis et l'anneau de manoeuvre pour transmettre la force de rotation de l'anneau de manoeuvre à la partie vis, le transmetteur de couple comportant un mécanisme de réduction pour transmettre la force de rotation de l'anneau de manoeuvre à la partie vis en réduisant la vitesse, et un limiteur de couple unidirectionnel pour arrêter la transmission du couple dans le sens de serrage de la partie vis à l'objet à serrer lorsqu'une charge déterminée est atteinte.

(57) The tightening screw of the invention comprises a screw member forming female threads or male threads in the shaft core part, a flange ring fitted to the outer periphery of the screw member to contact with the object to be tightened, an operating ring for feeding a rotational force by fitting oppositely to the flange ring on the outer periphery of the screw member, and a torque transmitting member interspaced between the screw member and operating ring for transmitting the rotational force of the operating ring to the screw member, wherein the torque transmitting member comprises a reduction mechanism for transmitting the rotational force of the operating ring to the screw member by reducing the speed, and a unidirectional torque limiter for cutting off transmission of torque in the tightening direction of the screw member to the object to be tightened at a specific load.

Abstract of the Disclosure

The tightening screw of the invention comprises a screw member forming female threads or male threads in the shaft core part, a flange ring fitted to the outer periphery of the screw member to contact with the object to be tightened, an operating ring for feeding a rotational force by fitting oppositely to the flange ring on the outer periphery of the screw member, and a torque transmitting member interspaced between the screw member and operating ring for transmitting the rotational force of the operating ring to the screw member, wherein

the torque transmitting member comprises a reduction mechanism for transmitting the rotational force of the operating ring to the screw member by reducing the speed, and a unidirectional torque limiter for cutting off transmission of torque in the tightening direction of the screw member to the object to be tightened at a specific load.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A tightening screw comprising:

a screw member forming female threads or male threads in a shaft core part;

a flange ring fitted to an outer periphery of said screw member to contact with an object to be tightened;

an operating ring for feeding a rotational force by fitting oppositely to said flange ring on an outer periphery of said screw member; and

a rotating ring rotated by turning operation of said operating ring, being freely held at eccentricity so as to be rotatable about an inner circumference of said operating ring;

wherein:

a tube is formed in a shaft core part of said rotating ring, and an outer gear is formed on an outside of the tube;

said screw member is overlaid inside and outside the shaft core part of said rotating ring;

a tube is formed on an outer surface of said screw member, and an inner gear is formed inside the tube to be partly engaged with a difference in the number of teeth from an outer gear of said rotating ring; and

said flange ring is disposed oppositely to said rotating ring, and engaging parts to be engaged with each other while defining the revolution and allowing the rotation of said rotating ring are formed on mutually confronting surfaces.

2. A tightening screw comprising:

a screw member forming female threads or male threads in a shaft core part;

a flange ring fitted to an outer periphery of said screw member to contact with an object to be tightened;

an operating ring for feeding a rotational force by fitting oppositely to said flange ring on an outer periphery of said screw member; and

a rotating ring rotated by turning operation of said operating ring, being freely held at eccentricity so as to be rotatable about an inner circumference of said operating ring;

wherein:

confronting surfaces opposing in an axial direction are formed in said rotating ring and said screw member, rolling grooves differing in a wave number are formed in mutually confronting sides by epicycloid and hypocycloid curves, and balls are placed in the rolling grooves; and

said flange ring is disposed oppositely to said rotating ring, and engaging parts to be engaged with each other while defining the revolution and allowing the rotation of the rotating ring are formed on the mutually confronting surfaces.

3. The tightening screw of claim 1 or 2, wherein said rotating ring comprises a unidirectional torque limiter for cutting off transmission of torque in the tightening direction from said operating ring to the object to be tightened at a specific load.

4. A tightening screw comprising:
a screw member forming female threads or male threads in a shaft core part;
a flange ring fitted to an outer periphery of said screw member to contact with an object to be tightened;
an operating ring for feeding a rotational force by fitting oppositely to said flange ring on an outer periphery of said screw member; and
a torque transmitting member interspaced between said screw member and said operating ring for transmitting the rotational force of said operating ring to said screw member;
wherein a torque limiter comprises a unidirectional torque limiter for cutting off transmission of torque in a tightening direction of said screw member to the object to be tightened at a specific load.

5. The tightening screw of claim 3 or 4, wherein said unidirectional torque limiter is composed of a sliding member capable of deforming elastically for cutting off transmission of torque in the tightening direction at a specific load, in the engaging part of the ring of either said flange ring or said rotating ring with respect to the ring.

6. A tightening screw for holding an object on a drive means, the screw comprising:
a screw member comprising a core part with a plurality of threads for engaging said drive means, a circular outer surface portion, and a circular ring portion having a

plurality of inwardly-directed inner gears, said inner gears being of a first number;
a flange ring comprising an engaging surface and a contacting surface, and disposed next to said screw member and having said contacting surface in contact with said object;
a rotating ring comprising an inner core part disposed to surround said circular outer surface portion of said screw member, and further comprising an intermediate ring portion having a plurality of outwardly-directed outer gears non-continuously engaged with said inner gears of said screw member, said inner gears being of a second number different from said first number; and
an operating ring comprising an inner surface and disposed to cover said rotating ring and rotatably hold eccentrically said rotating ring with said inner surface so that upon rotation of said operating ring, said rotating ring is turned to controllably rotate said screw means through engagement of said inner and outer gears, said operating ring further comprising an end surface which is engaged with said engaging surface of said flange member while defining a revolution and allowing rotation of said rotating ring;
wherein said rotating ring comprises a unidirectional torque limiter for cutting off transmission of torque in a tightening direction as supplied from said operating ring to said object being tightened.

7. The screw of claim 6, wherein said unidirectional torque limiter comprises a sliding member disposed in an

engaging part of said flange ring, and comprises an elastically deformable material.

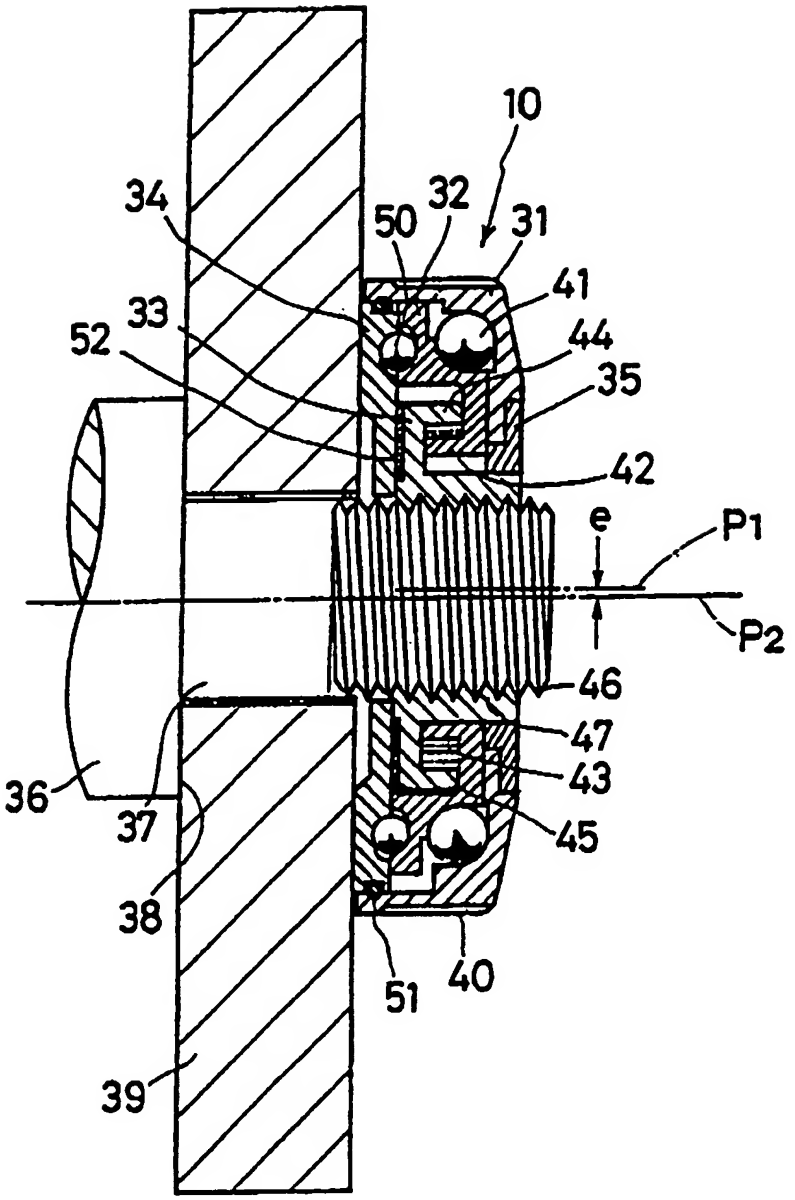
8. The screw of claim 6, wherein said unidirectional torque limiter comprises a sliding member disposed in an engaging part of said rotating ring, and comprises an elastically deformable material.

9. A tightening screw for holding an object on a drive means, the screw comprising:
a screw member comprising a core part with a plurality of threads for engaging said drive means, and a confronting surface;
a flange ring comprising an engaging surface and a contacting surface and disposed next to said screw member with said contacting surface in contact with said object;
a rotating ring comprising a confronting surface and disposed so that said confronting surface thereof is opposite in an axial direction from said confronting surface of said screw member, and wherein rolling grooves differing in wave numbers are formed in said confronting surfaces by epicycloid and hypocyclid curves;
a plurality of spherical balls disposed within said rolling grooves formed between said confronting surfaces of said rotating ring and said screw member;
wherein said flange ring is disposed to be opposite said rotating ring with said engaging surface thereof being engaged with said engaging surface of said rotating ring so as to define a revolution and allowing rotation of said rotating ring; and

an operating ring comprising an inner surface and disposed to cover said rotating ring and rotatably hold eccentrically with said inner surface said rotating ring so that upon rotation of said operating ring said rotating ring is rotated to thereby controllably rotate said screw member through said plurality of spherical balls in said rolling grooves;

wherein said rotating ring comprises a unidirectional torque limiter for cutting off transmission of torque in a tightening direction from said operating ring to said object to be tightened.

FIG.1



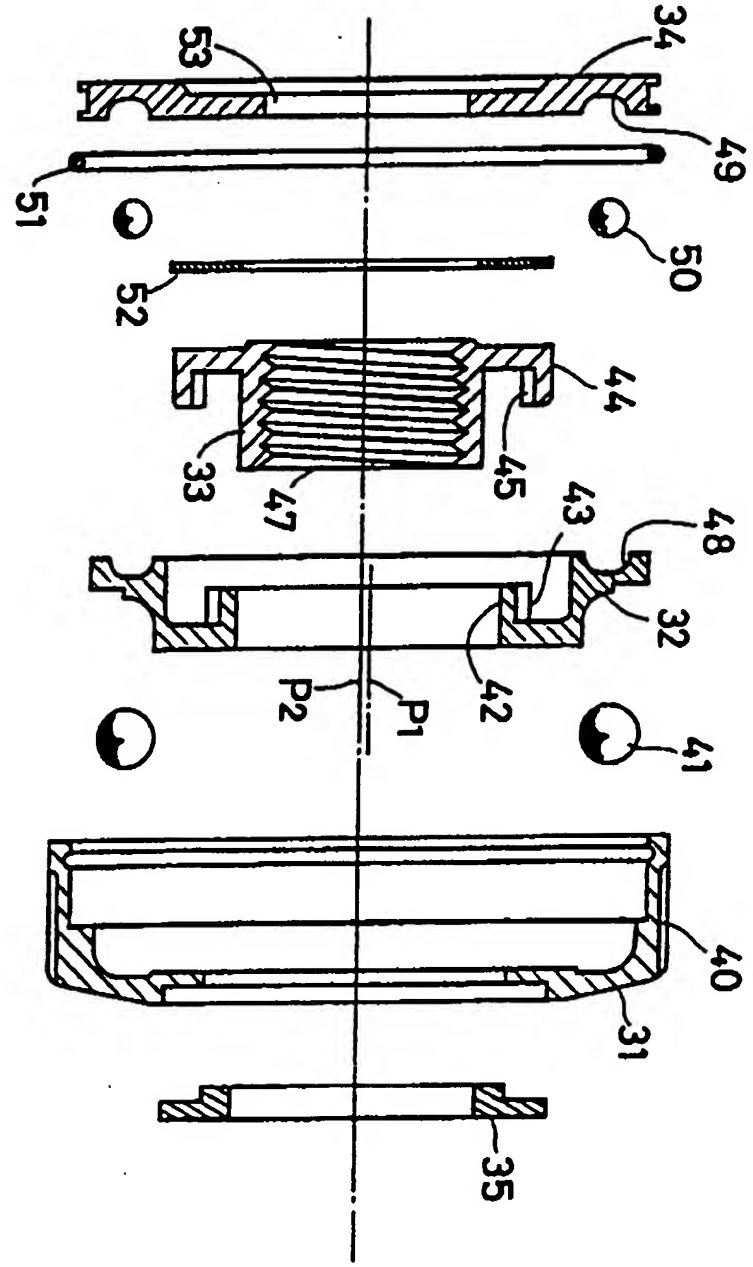


FIG.2

FIG.3

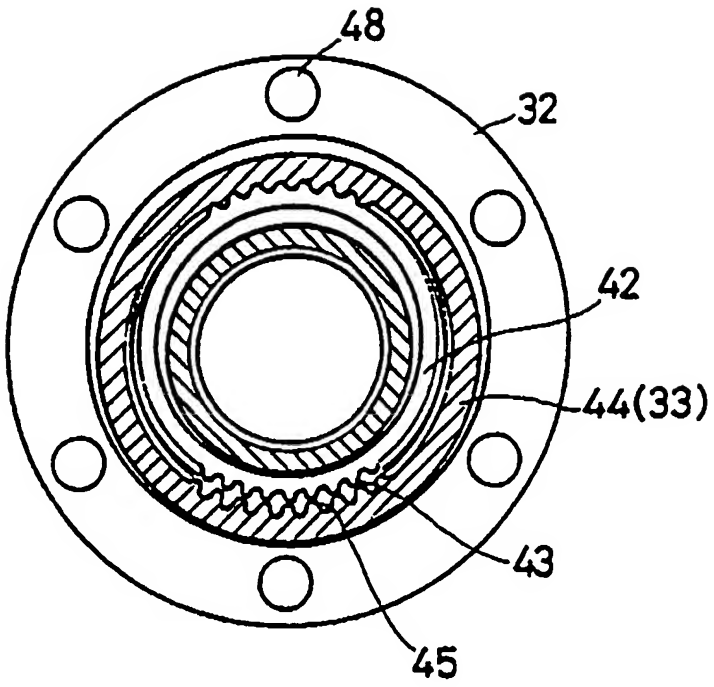
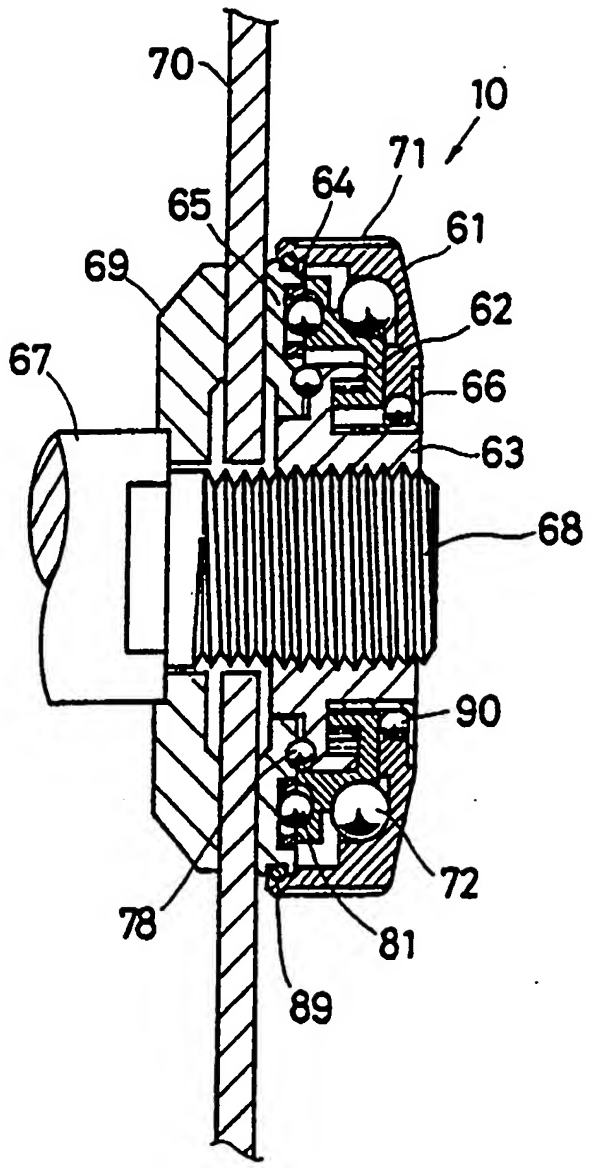


FIG.4



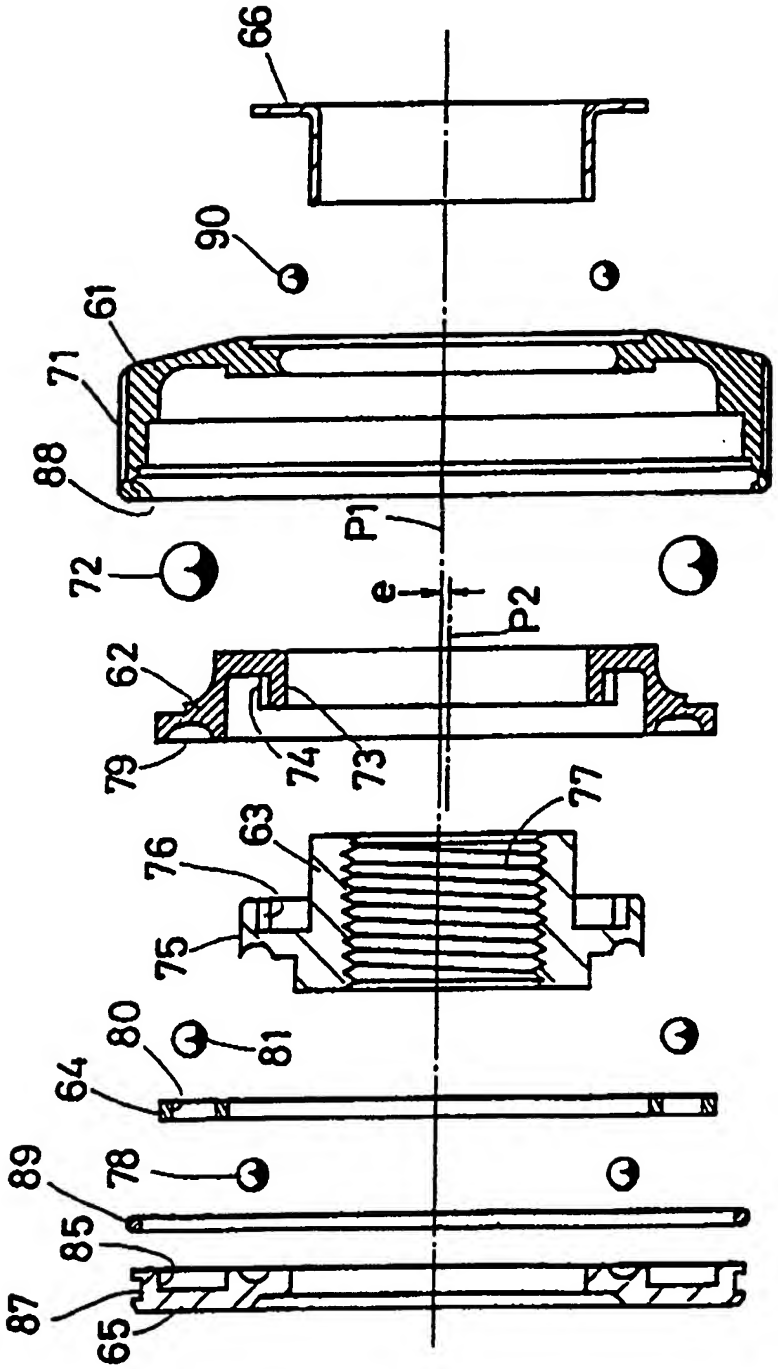


FIG.5

FIG.6

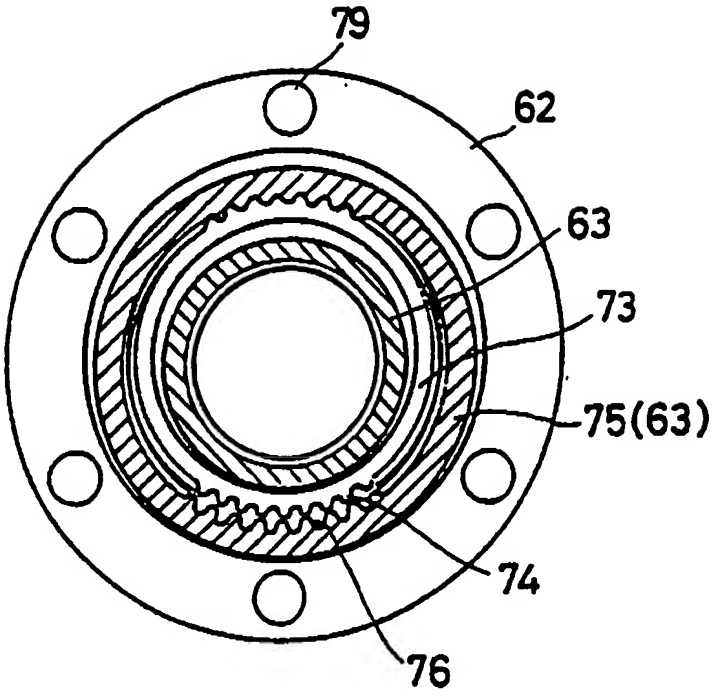


FIG.7

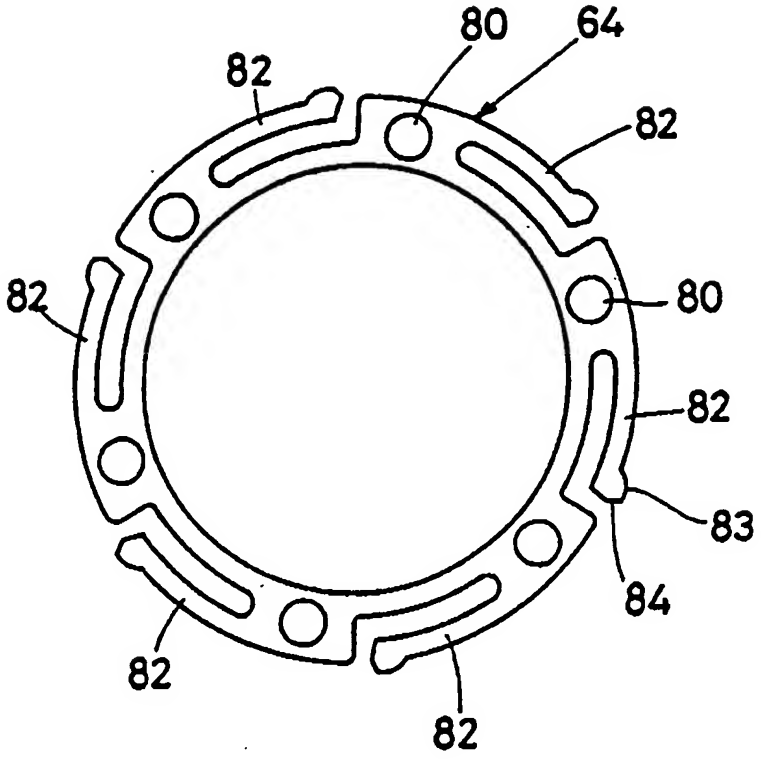


FIG.8

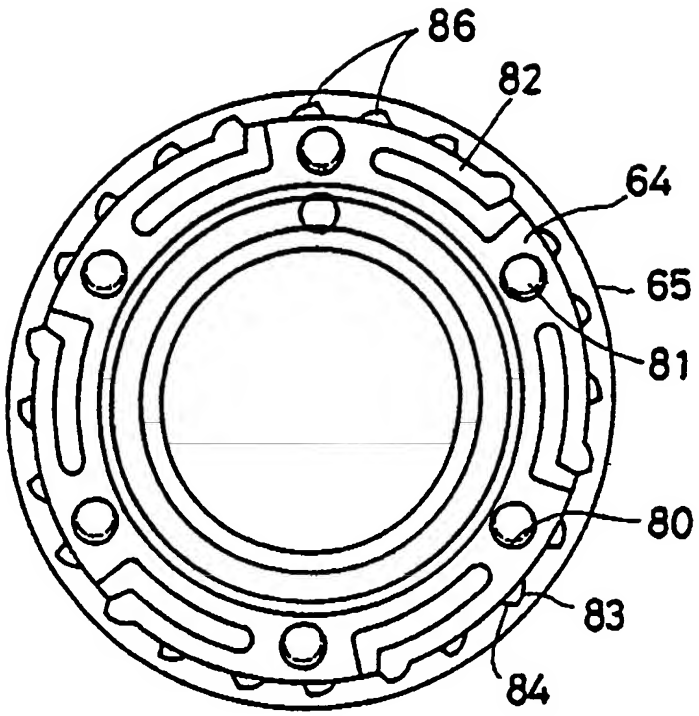


FIG.9

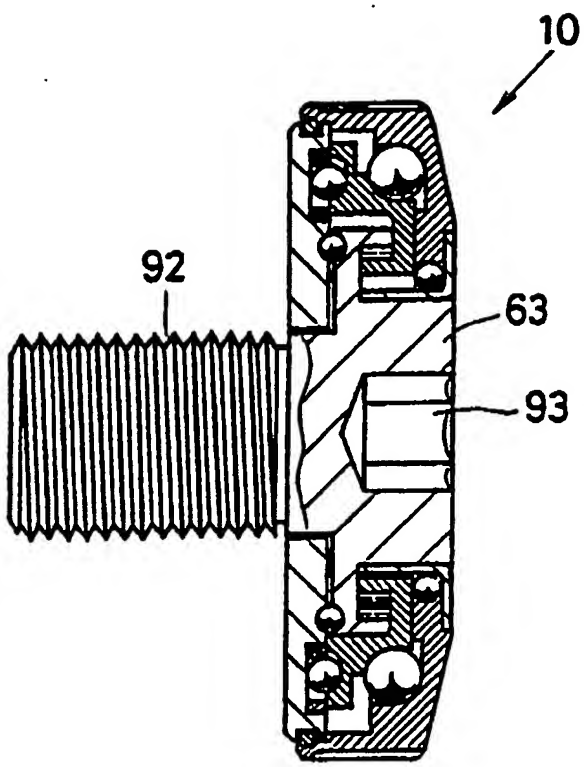


FIG.10

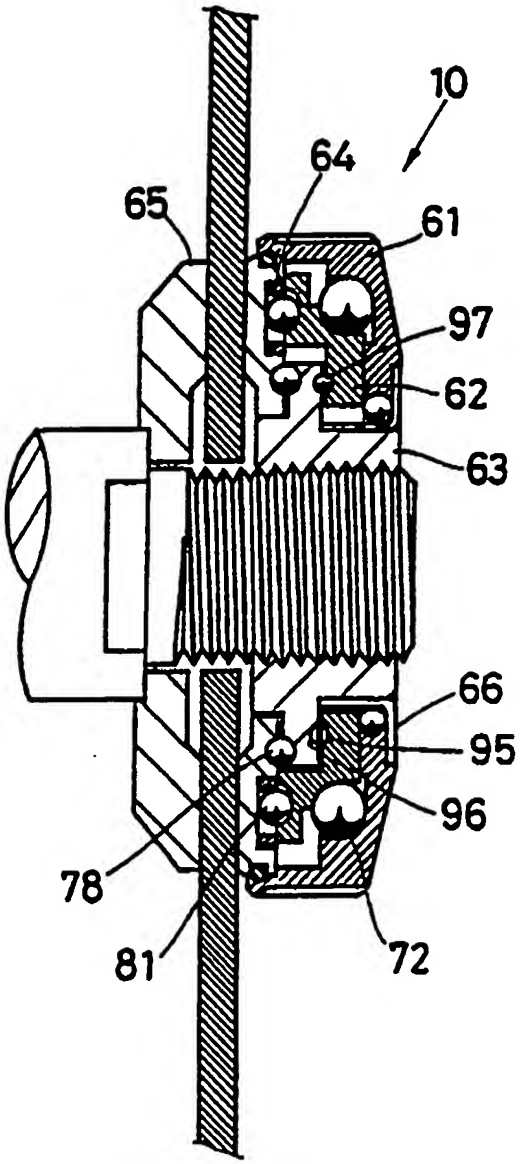
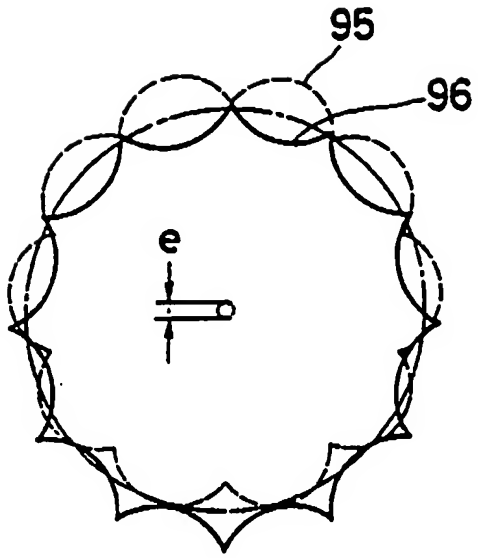
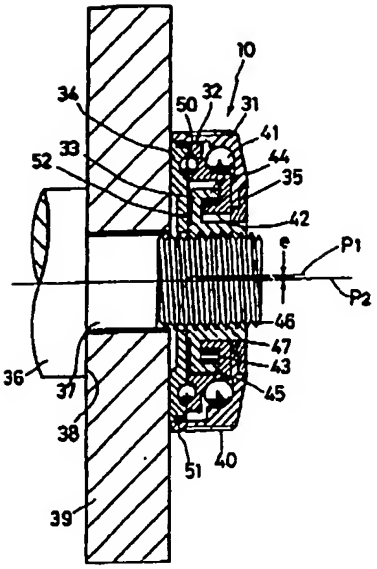


FIG.11

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